LONGLEAF PINE SEEDLING SURVIVAL AFFECTED BY DEPTH OF PLANTING

McClain B. Smith, Jr.

U. S. Forest Service, Bentley, Louisiana

In the winter of 1947-48 about 2, 000 longleaf pine seedlings were planted on the DeSoto National Forest near Brooklyn, Mississippi, to test the effect of depth of planting on survival. Philip C. Wakeley of the Southern Forest Experiment Station had previously reported better survival for deep planted seedlings at the end of the first growing season. His experimental plantings were destroyed in the course of Army maneuvers, and no information was available on results for longer than one growing season. The question of depth became of greater importance at this time with the sudden spurt in machine tree planting, which does not permit high accuracy in depth of setting.

Ten treatments were tested: seven depths of seedlings planted by the conventional bar-slit method and three depths of seedlings planted with a Lowther planting machine. Bar-slit treatments were from 1-1/2 inches deep to 1-1/2 inches shallow by 1/2 inch intervals. Machine treatments were about 1 inch deep, correct depth (same as grown at nursery), and about 1 inch shallow. More refinement of depth setting of machine planted seedlings was not possible. Eight blocks of seedlings were planted, four on a wet site and four on a dry site. Each block contained 10 randomized rows of 25 seedlings each, all the seedlings in any given row receiving the same treatment.

In the spring of 1953 at the beginning of the sixth growing season the following survival percentages were observed:

Bar-slit planted	Deep 1 1/2"	44 1/2%	Shallow 1 1/2"	33%
	Deep 1"	59 1/2%	Shallow 1"	49%
	Deep 1/2"	76 %	Shallow 1/2"	48 1/2%
		Correct depth 68%		
Machine planted	Deep 62 1/3%		Shallow 38 2/3%	
		Correct depth 72 1/2%		

It should be noted that the distance between the root collar and the tip of the bud on a healthy 1-0 longleaf pine seedling is about 1 /2" so that a seedling planted 1 /2" deep does not have its bud below ground level. Seedlings planted 1" and 1 1/2" deep actually had their buds covered with soil. Seed-

lings planted 1/2", Ilk, or 1 1/2" shallow all had exposed root surface above ground level.

The five-year data follow in general the same pattern as survival figures for the end of the first and third growing seasons, and confirm Wakeley's findings. Although the five-year data have not yet been analyzed statistically, some things are apparent. In every case a shallow setting gave poorer survival than a deep setting of the same degree. With the exception of trees planted 1/2" deep, the greater the deviation from correct depth the poorer was the survival. At the end of three years many of the deeper planted seedlings appeared to be dying, but many recovered and appeared very healthy at the end of the fifth year with buds actually above ground level.

Some trees in each treatment except "machine deep" had started height growth at the end of five years, with shallow planted seedlings ahead of deep planted ones. Several years must elapse before height growth data will be conclusive.

Until additional experimental work in other years and on other sites indicates otherwise, it is recommended that machine planters of longleaf pine seedlings strive to plant them with the root collars at ground level or within 1/2" below ground level.

Multiple Embryos in Ponderosa Pine Seed. Ponderosa pine seed from the Chelan National Forest produced one set of twin seedlings and one set of triplets, each from a single seed. They were found in the germinator in March at Wind River by F. W. Deffenbacher and R. W. Steele. The phenomenon might be common among tree species but we have no other record of it.

Elmer Matson, Pacific Northwest Forest
Experiment Station, Portland Oregon